JPDO NextGen EA Briefing

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Partners in the Next Generation Air Transportation System
Joint Planning and Development Office

Drivers

Outcomes/Value

Multi-Agency Leadership | Advanced Aviation Operations & Safety | Intelligent Weather Solutions | Advanced Operations & Security | Enhanced Layered Security | Aeronautics Research & Technology | National Policy

Collaboration and Interoperability

- **Joint mission needs (capacity, security, defense, environment, safety, global harmonization) drive what we architect, engineer, resource, implement, and govern**

- **Today's architect requires a shift to Command, Control + Collaboration → Choices, Actions, Decisions**

- **All NextGen capabilities require information sharing via Net-Centric Operations**

- **Forge innovation through public/private/academic/research efforts**

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Need for Collaboration and Federation
No "Cookbook" Approach

- Work from core, shared principles, framework, taxonomy and ground work in reality – needs of users and decision-makers.

- Focus on interoperability less integration and support common discoverable services, just enough standards, clear roles and responsibilities, rules of engagement, accountability, decision-making, and innovation opportunities.

- Adequately characterize the degree of collaborative interdependence to understand interoperability requirements, develop appropriate architecture, and design strategies that meet those challenges.

NextGen EA Federation Goals and Principles

EA Federation Goals:

– Facilitate cooperative decision-making across the NextGen partner and stakeholder communities and a common understanding of NextGen

– Detail the full spectrum of NextGen concepts and capabilities described in the NextGen ConOps using architecture descriptions and information

– Provide NextGen partners and stakeholders with a well-managed standard body of knowledge that is timely, relevant, and accessible

– Increase the agility, reuse, and interoperability of partner agency assets by leveraging existing architecture descriptions and/or artifacts

EA Federation Principles:

– Respect the diverse requirements of individual NextGen partner agencies and focus on the associations that cut across organizational boundaries, roles, and responsibilities

– Maximize the use of existing partner agency architecture descriptions and artifacts regardless of structure and format (i.e., not re-building architectures)

– Utilize a data-centric architecture approach rather than product-centric

By creating a federated environment, the JPDO can conduct interagency analysis (i.e., gap/overlap analysis)
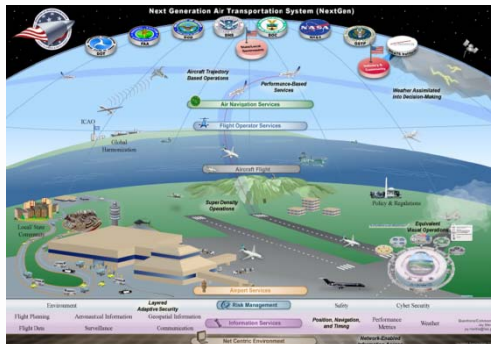
What is the NextGen EA?

It is the JPDO's method and tool to decompose and describe:

– NextGen concepts and capabilities

– Target operational and system architectures

– Improvements and enabling solutions

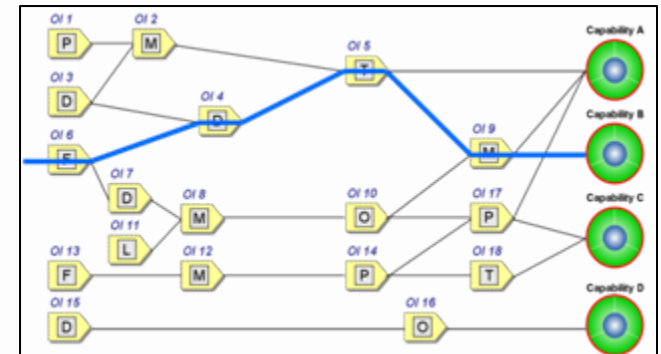**But to achieve the transformation will require…**

– New policies to create new behavior

– Modernization to prepare the infrastructure

– R&D to create new functionality

NextGen Concepts and Capabilities
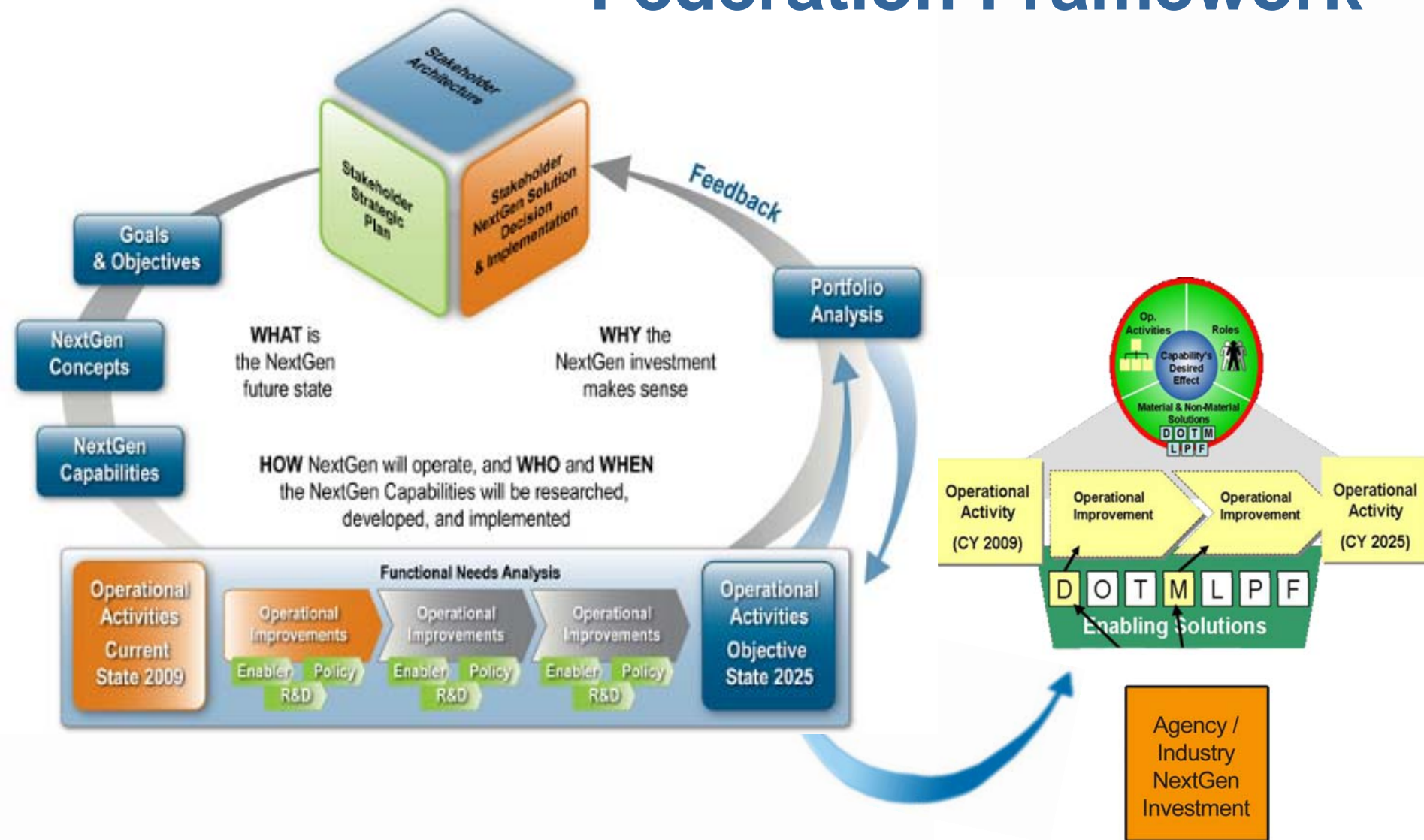
Target Operational and System Architectures

Operational Improvements and Enabling Solutions, Policies, and R&D

The NextGen EA goal is to articulate the 'curb-to-curb' transformation of air transportation…

How is the NextGen EA Organized?

The NextGen EA is operationally focused and organized around Mission Areas, Mission Support, and Infrastructure.

DoDAF OV-5 and FEA BRM (functional capabilities)

A.0 Conduct Air Transportation Services

A.1 Provide Airport Services
A.2 Provide Flight Operator Services
A.3 Conduct Aircraft Flight
A.4 Provide Air Navigation Services
A.5 Provide Information Services
A.6 Provide Risk Management Services
A.7 Operate in the Net-Centric Environment

A5.1 Provide Weather Information
A5.2 Provide Surveillance Information
A5.3 Provide Fixed-Object Information

- • Planning
- • Policy
- • Governance
- • Operations
- • Implementation
- • Maintenance

Mission

Mission Support

Infrastructure

Enterprise Architecture 2025
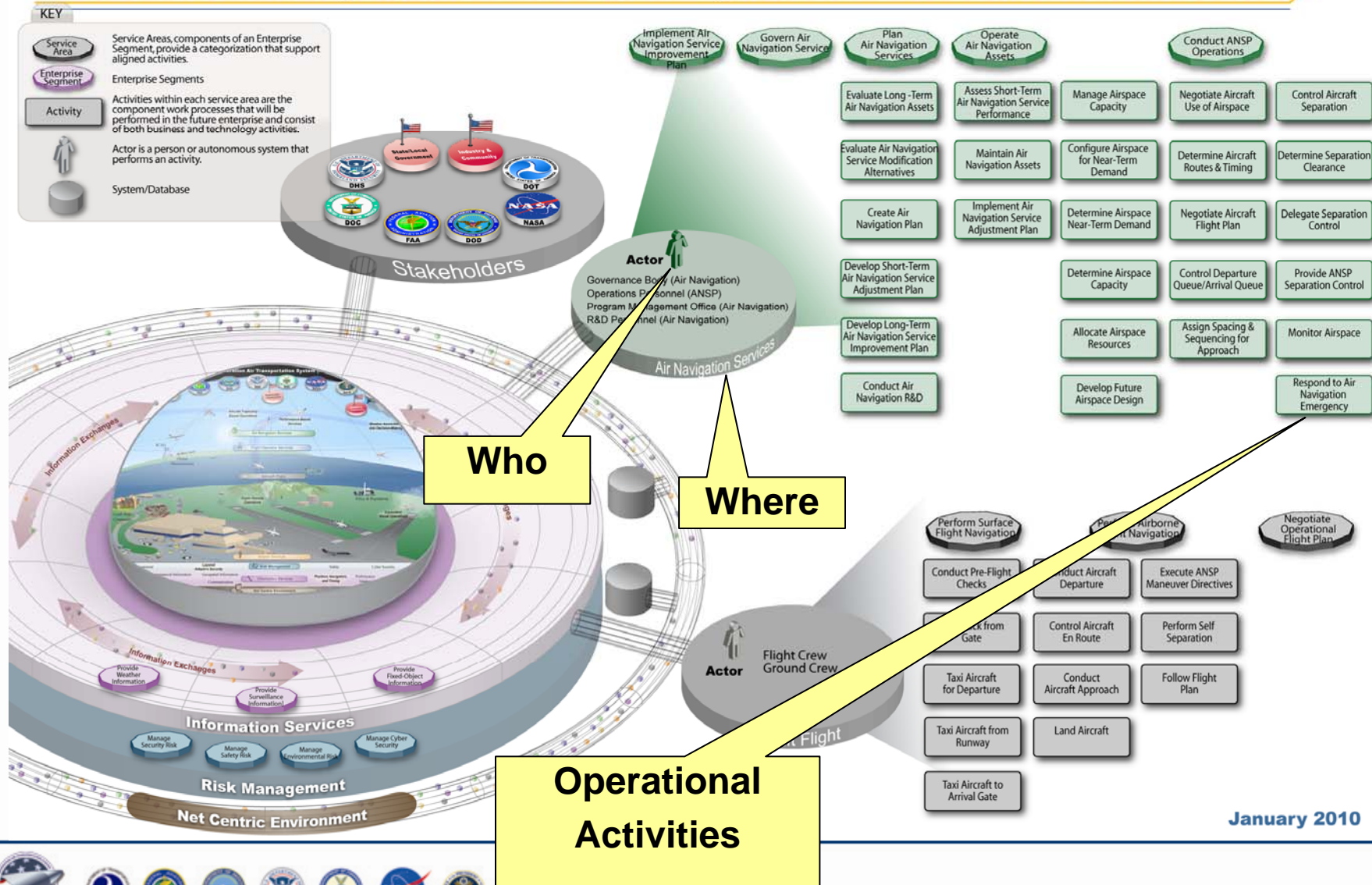
How is the NextGen EA Developed?

The NextGen EA's development methodology uses two industry frameworks (DoDAF and FEA) and is based on a collaborative, iterative approach, organized around capabilities that support the NextGen mission

1. **Iterative approach to developing and sustaining capability-based, mission segment architecture descriptions**

   - Define actionable plan for architecture development and integrated study team
   - Develop and analyze a cohesive baseline and target architecture
   - Develop transition plan aligned with the broader enterprise
   - Translate outputs into terms decision-makers can act upon: implementation plan, business case, & briefings

2. **End-to-end governance activities infused throughout**

3. **Continual collaboration, outreach, and adoption activities span the entire methodology**

Mission Segment/Capability Architecture Development Methodology
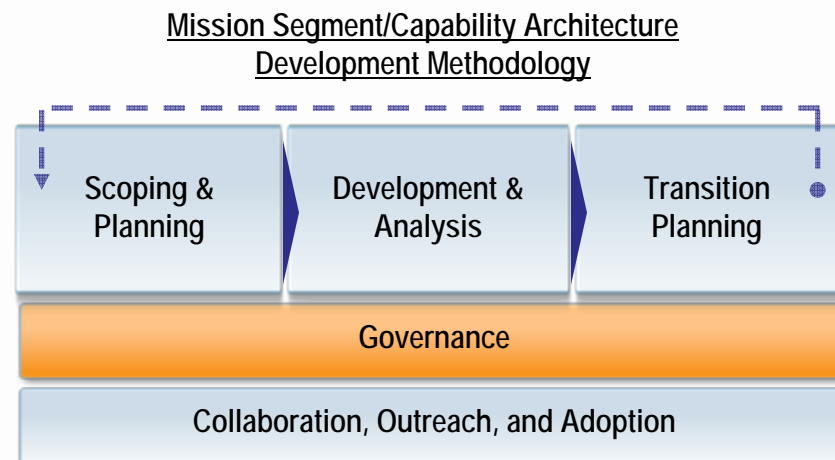
- Concept Development
- Operational Scenarios
- Use Cases
- Information Exchange Requirements
- Supporting EA Views (OV and SV)
- IWP assessment

What Can I Find in the NextGen EA?

At the NextGen Enterprise Level…

DoDAF 1.5 Views

- Architecture Overview and Summary (AV-1)
- Integrated Dictionary (AV-2)
- Community Model (OV-1)
- Operational Node Connectivity Description (OV-2)
- Operational Information Exchange Matrix (OV-3)
- Operational Activity Decomposition (OV-5a)
- Operational Activity Flows (OV-5b)
- System Node Connectivity Description (SV-1)
- System to System Matrix (SV-3)
- Agency-specific Cross Reference Table (New)
- Integrated Work Plan (Transition Plan)

Data exists to create the following DoDAF 2.0 Viewpoints

- Vision (CV-1)
- Capability Taxonomy (CV-2)
- Capability Phasing (CV-3)
- Capability Dependencies (CV-4)
- Capability to Organization Mapping (CV-5)
- Capability to Operational Activity (CV-6)
- Project Portfolio Relationships (PV-1)
- Project Timelines (PV-2)
- Project to Capability Mapping (PV-3)

And have the framework to capture the data to create other DoDAF 2.0 Viewpoints

At the NextGen Mission Segment / Capability Level…

	Weather	Int. Surv.	TBO Study
• Operational Node Connectivity Description (OV-2)	X	X	In Progress
• Operational Information Exchange Matrix (OV-3)	X	X	In Progress
• Operational Scenarios & Use Cases (OV-6c)	X	X	In Progress
• System Node Connectivity Description (SV-1)	X	X	To Update
• System to System Matrix	X	X	To Update
• System Function Descriptions (SV-4)	X	X	To Update

Future Work: Airline Ops Center/Flight Ops Center, Airports, ICNS (integrate from FY09 work)

Goal to Inform Decision-Making

Next Generation Air Transportation System
Joint Planning and Development Office
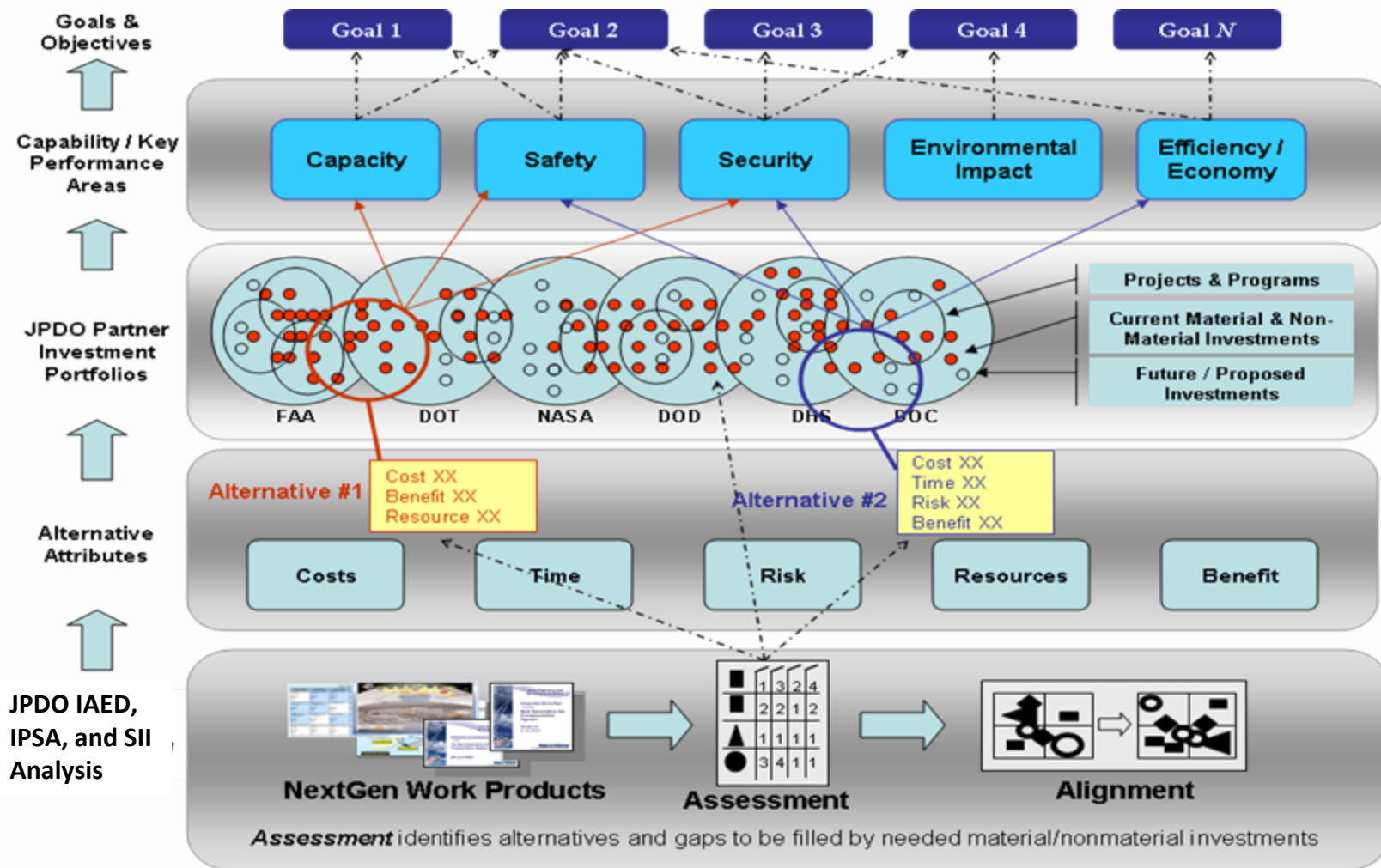
What Can We Expect More of In Future?

- *More attention* to organizational and social architecture (non-material reqs.) in additional to operational and systems architecture
- *Pull the pieces together* … collaboration, integrated architecture and engineering efforts fused into interagency experimentation efforts (public/private, academia, R&D, tests, prototypes, demos, etc.)

Fusion

Governance The "environment" influencing sharing

Policy The "rules" for sharing

Technology The "capability" to enable sharing

Economics The "value" of sharing

Culture The "will" to share

Deliver Capabilities

Provide Leadership

Oversee Resources

Mitigate Risk

DELIVER CAPABILITIES | Drive robust and extensible cross domain capabilities to support a secure and integrated information enterprise.

OVERSEE RESOURCES | Maximize return on CD cross domain investments, reduce duplication of effort, and increase efficiency of CD activities.

MITIGATE RISK | Support risk-based decisions by enabling global awareness of cross domain operational connections.

PROVIDE LEADERSHIP | Provide leadership across the interagency spectrum to ensure coordinated cross domain governance, oversight and community reciprocity.

Key Interagency Strategic Initiatives

- **Integrated Surveillance**
  - Draft Concept of Operations and Architecture analysis completed
  - C2 Gap Filler multi-agency demonstration (DoD leadership) aligned
  - Governance options being prepared for SPC decision

- **Net-Centric Operations Information Exchange**
  - Multi-agency commitment to development
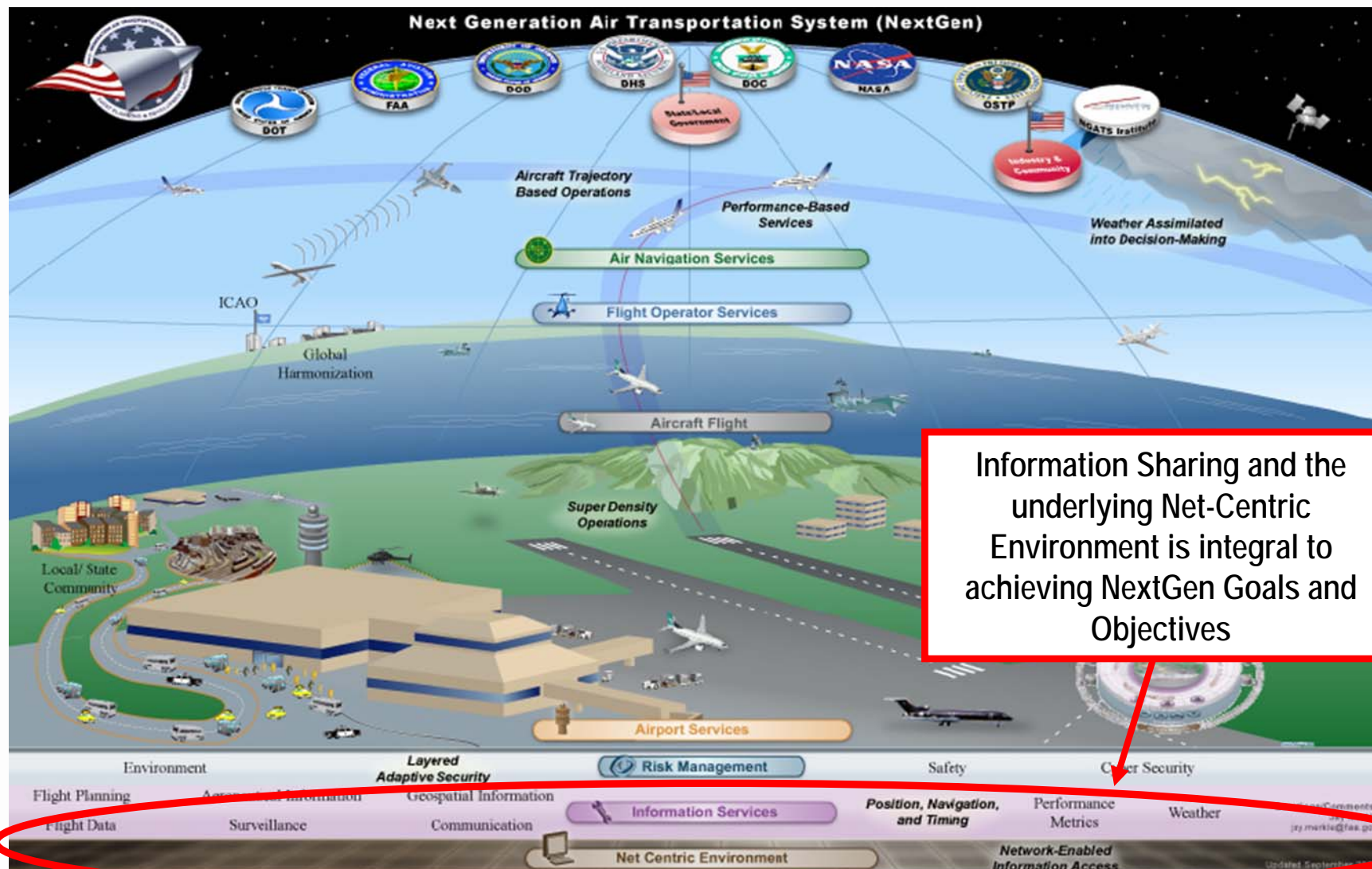 - DoD leadership established and planning underway
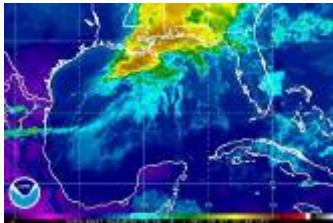
- **Aviation Weather**
  - Decision on Roles and Responsibilities (FAA, DOC, DoD)
  - Detailed planning and implementation underway

- **Aviation Safety**
  - Common Safety Management System Standard and Information Sharing approved
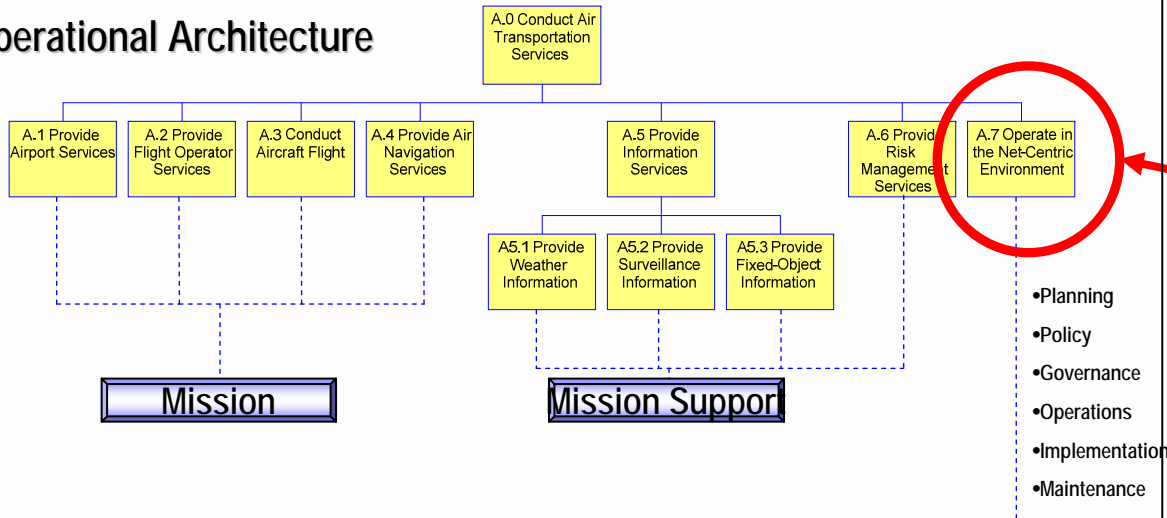 - National Aviation Safety Strategic Plan prepared for SPC decision

Federation Opportunity Net-Centricity in NextGen

Information Sharing and the underlying Net-Centric Environment is integral to achieving NextGen Goals and Objectives

NextGen EA Net-Centric Focus

Operational Architecture

A.0 Conduct Air Transportation Services

- A.1 Provide Airport Services
- A.2 Provide Flight Operator Services
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- A.4 Provide Air Navigation Services
- A.5 Provide Information Services
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- A.7 Operate in the Net-Centric Environment

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Mission

Mission Support

- Planning
- Policy
- Governance
- Operations
- Implementation
- Maintenance

The NextGen EA OV-5 is structured to include the extended taxonomy for how the NextGen Net-Centric environment will operate.

Information Architecture

Architectural descriptions of the conceptual, logical and physical NextGen Data Model, including the business rules for data exchange, message formats, file structures, and schemas.

System / Service Architecture

Architectural descriptions of the systems and services, their functionality, the interfaces and interconnections, the resources being exchanged, the metrics, and how they will be implemented over time.

Infrastructure / Technology Architecture

Infrastructure

Architectural descriptions of the standards that apply to NextGen Net-centric Operations, as well as emerging standards and their potential impact.

The existing NextGen EA views can be further decomposed , or new views can be created, to ensure Net-centric capabilities are properly reflected.

Thank you!

Questions?